

## CLAIMS

What is claimed is:

- 1 1. An apparatus for retaining a panel within a frame, said apparatus comprising:  
2 a bracket member for fitting over an edge of the panel, wherein said bracket  
3 member provides edge and lateral support for the panel; and  
4 a rack and gear mechanism affixed to said bracket member, said rack and gear  
5 mechanism comprising:  
6 a circular driving gear; and  
7 a rack member having a foot member attached at one end and further  
8 having a rack gear engaging said circular driving gear such that said rack member  
9 is linearly movable with respect to said bracket member responsive to rotational  
10 actuation of said circular driving gear.
- 1 2. The apparatus of claim 1, wherein said bracket member has a substantially U-shaped  
2 inner contour and having a first sidewall coupled in proximity to said rack and gear  
3 mechanism and connected by a backwall to an opposing second sidewall displaced from  
4 said body member.
- 1 3. The apparatus of claim 2, wherein said foot member includes a toe end extending  
2 therefrom, said toe end substantially aligned with the second sidewall of said bracket  
3 member.
- 1 4. The apparatus of claim 2, wherein said bracket member further comprises clip means  
2 for laterally securing the panel within the U-shaped inner contour.
- 1 5. The apparatus of claim 1, wherein said bracket member is affixed to a backside of said  
2 rack and gear mechanism, said rack and gear mechanism further comprising an actuator  
3 drum coaxially affixed to said driving gear and extending outwardly from an opposing  
4 front side of said rack and gear mechanism.

1 6. The apparatus of claim 5, further comprising an actuator wheel coaxially affixed to the  
2 distal end of said actuator drum, wherein said actuator wheel has a diameter at least twice  
3 the diameter of said driving gear.

1 7. The apparatus of claim 5, wherein said actuator drum includes a diametric slot across  
2 its distal end.

1 8. The apparatus of claim 7, further comprising an actuator key engagable into the  
2 diametric slot at the distal end of said actuator drum.

1 9. The apparatus of claim 8, wherein said actuator key comprises a substantially flat  
2 member having a slot engagement edge for engaging the diametric slot at the distal end  
3 of said actuator drum and further including a winged handle member.

1 10. The apparatus of claim 9, wherein said winged handle member has a lever span of at  
2 least twice the diameter of said circular driving gear.

1 11. The apparatus of claim 5, further comprising a cover member substantially enclosing  
2 said rack and gear mechanism with at least a portion of the distal end of said actuator  
3 drum extending outwardly therefrom.

1 12. The apparatus of claim 1, wherein said rack and gear mechanism further includes  
2 ratchet means restricting bidirectional linear motion of said rack member with respect to  
3 said bracket member.

1 13. The apparatus of claim 12, wherein said ratchet means comprises:  
2 a row of ratchet teeth on a lengthwise side surface of said rack member; and  
3 a ratchet arm member engaging the ratchet teeth allowing advancement of said  
4 rack member in a linear direction in which a foot member affixed to one end of said rack  
5 member extends outwardly away from said bracket member and inhibiting retraction of  
6 said rack member in the opposing linear direction.

1 14. The apparatus of claim 13, further comprising a ratchet disengagement lever arm that  
2 may be manually pressed to disengage said ratchet arm member from the ratchet teeth.

1 15. The apparatus of claim 1, wherein said rack and gear mechanism further comprises  
2 support bearing means for providing vertical lengthwise bearing support and horizontal  
3 lengthwise bearing support for said rack member.

1 16. The apparatus of claim 15, wherein said support bearing means comprises:  
2 a vertical bearing guide channel disposed lengthwise along a lateral side of said  
3 rack member; and  
4 a vertical guide member having a guide flange engaged into said vertical bearing  
5 guide channel.

1 17. The apparatus of claim 15, wherein said support bearing means comprises:  
2 a horizontal bearing guide channel disposed lengthwise along said rack gear; and  
3 a horizontal guide member having a guide flange engaged into said horizontal  
4 bearing guide channel.

1 18. The apparatus of claim 1, wherein said rack and gear mechanism is fabricated from a  
2 composite polymer.

1 19. The apparatus of claim 18, wherein said composite polymer comprises Delrin.

1 20. A panel barrier assembly for providing a panel barrier within a framed volume, said  
2 panel barrier assembly comprising:

3 a substantially flat panel for providing a barrier within the framed volume; and  
4 at least one panel retention device for compressively securing said panel against at  
5 least two opposing frame surface areas such that the panel is securely suspended within  
6 the framed volume, said at least one panel retention device comprising:  
7 a substantially U-shaped bracket member fitted over an edge of the panel;  
8 and

9 a rack and gear mechanism affixed to said bracket member, said rack and  
10 gear mechanism comprising:

11 a driving gear; and

12 a rack member having a foot member attached at one end and  
13 further having a rack gear engaging said driving gear such that said rack  
14 member is linearly movable with respect to said bracket member  
15 responsive to rotational actuation of said driving gear.

1 21. The panel barrier assembly of claim 20, wherein said driving gear is a spur gear  
2 having a rotary actuation plane parallel to the panel.

1 22. The panel barrier assembly of claim 20, wherein said rack and gear mechanism  
2 further includes ratchet means restricting bidirectional linear motion of said rack member  
3 with respect to said bracket member.

1 23. The panel barrier assembly of claim 22, wherein said ratchet means comprises:  
2 a row of ratchet teeth on a lengthwise side surface of said rack member; and  
3 a ratchet arm member engaging the ratchet teeth to allow advancement of said  
4 rack member in a linear direction in which a foot member affixed to one end of said rack  
5 member extends outwardly away from said bracket member and inhibiting retraction of  
6 said rack member in the opposing linear direction.

1 24. The panel barrier assembly of claim 20, wherein said rack and gear mechanism  
2 further comprises support bearing means for providing vertical lengthwise bearing  
3 support and horizontal lengthwise bearing support for said rack member.

1 25. The panel barrier assembly of claim 24, wherein said support bearing means  
2 comprises:

3 a vertical bearing guide channel disposed lengthwise along a lateral side of said  
4 rack member; and

5           a vertical guide member fixedly attached to said bracket and having a guide  
6 flange engaged into said vertical bearing guide channel.

1   26. The panel barrier assembly of claim 24, wherein said support bearing means  
2 comprises:

3           a horizontal bearing guide channel disposed lengthwise along said rack gear; and

4           a horizontal guide member fixedly attached to said bracket and having a guide  
5 flange engaged into said horizontal bearing guide channel.

1   27. The panel barrier assembly of claim 20, wherein said rack and gear mechanism is  
2 fabricated from a composite polymer.

1   28. The panel barrier assembly of claim 27, wherein said composite polymer comprises  
2 Delrin.